

APPARATUS, SYSTEM, AND METHOD FOR WIRELESS NOTIFICATIONS

1 TECHNICAL FIELD

2 This invention relates, in general, to a wireless notification system

3 BACKGROUND

4 In today's working environment, there are many different systems which
5 can be used to communicate with an individual. Such systems may include an e-
6 mail system to transmit e-mails to an individual, a telephone system to establish a
7 telephone call with an individual, a voicemail system to provide voice messages
8 to an individual, and various other computer based systems for providing an
9 individual with reminders of meetings or other calendared events. These systems
10 are generally locationally dependent in that they typically require the intended
11 recipient of the information to be located at the individual's desk, computer area,
12 workstation, work area or the like, for instance, in an office environment. When
13 an individual leaves this area, the e-mails, voicemails, and meeting and calendar
14 reminders may accumulate, and time sensitive notifications or reminders may not
15 be received by the intended recipient until after a deadline or reminder time has
16 passed.

17 As recognized by the present inventors, what is needed is a system which
18 provides notifications to a user relating to e-mails, voice messages, meeting
19 and/or calendar reminders, or any combination thereof, when the user is away
20 from the user's desk, work area, computer area, workstation, or the like.

21 It is against this background that various embodiments of the present
22 invention were developed.

23 SUMMARY

24 In light of the above and according to one broad aspect of one embodiment
25 of the invention, disclosed herein is a wireless notification system which provides
26 notifications to a user relating to e-mails, voice messages, meeting and/or
27 calendar reminders, or any combination thereof, when the user is away from the
28 user's desk, computer area, work area, or workstation or the like. In this manner,
29 time-sensitive data may be provided to the intended recipient even when the
30 intended recipient is away from these areas.

1 In another embodiment, disclosed herein is an apparatus for notifying a
2 user of an occurrence of one or more events relating to the user's computer. In
3 one embodiment, the apparatus includes a body, a wireless receiver for receiving
4 a wireless message containing a notification corresponding to the occurrence of
5 an event which occurred at the user's computer, a microprocessor positioned
6 within the body for processing the notification, and a display positioned on the
7 body for displaying information relating to the notification. The event may
8 include, for example, a receipt of a meeting reminder at the computer, a receipt of
9 a calendar reminder at the computer, or a receipt of an e-mail message at the
10 computer. The apparatus may also have a memory having a portion configured as
11 a queue for storing multiple notifications, and at least one user selectable button
12 coupled with the microprocessor for controlling the display of the information
13 relating to the notification. The apparatus may be embodied as a pen, pencil, or
14 integrated with a device or utensil which a user may use in a work, office, or
15 computing or telephonic environment or situation, such as a pen, pencil, pointer,
16 or other implement, device, or article.

17 In another embodiment, disclosed herein is a method for notifying a user of
18 an occurrence of an event relating to the user's computer. A notification device
19 is provided including a microprocessor, a display for displaying data, and a
20 wireless receiver for receiving data. An event occurring at the user's computer –
21 such as a receipt of a meeting reminder, a calendar reminder, or an e-mail
22 message – is detected, and a notification corresponding to the event is transmitted
23 to the notification device. The notification is received at the notification device,
24 and information relating to the notification is displayed on the notification device.

25 A base station may be provided having, in one embodiment, a cradle for
26 receiving the notification device. If the notification device is positioned within
27 the cradle, then the detecting operation is disabled until a time when the
28 notification device is removed from the cradle.

29 The foregoing and other features, utilities and advantages of various
30 embodiments of the invention will be apparent from the following more particular
31 description of various embodiments of the invention as illustrated in the
32 accompanying drawings and claims.

1 **DESCRIPTION OF THE DRAWINGS**

2 Fig. 1 illustrates a wireless notification system including a wireless
3 notification device having a display and buttons for controlling the display, in
4 accordance with an embodiment of the present invention;

5 Fig. 2 illustrates a block diagram of a base station for communicating with
6 a wireless notification device, in accordance with an embodiment of the present
7 invention;

8 Fig. 3 illustrates a block diagram of a wireless notification device, in
9 accordance with an embodiment of the present invention;

10 Fig. 4 illustrates a state diagram of various modes of operation of a
11 wireless notification device, in accordance with an embodiment of the present
12 invention;

13 Figs. 5A-5E illustrate various sample display screens for a wireless
14 notification device, in accordance with an embodiment of the present invention;

15 Fig. 6 illustrates an example of a cradle for receiving one example of a
16 wireless notification device, in accordance with an embodiment of the present
17 invention; and

18 Fig. 7 illustrates a wireless notification device having a contact switch in
19 communications with a clip of the wireless notification device, the contact switch
20 and clip controlling the display of the wireless notification device, in accordance
21 with an embodiment of the present invention.

22 **DETAILED DESCRIPTION**

23 In accordance with various embodiments of the present invention,
24 disclosed herein is a wireless notification system which provides a user with
25 notifications of events. In one embodiment, the wireless notification system
26 includes a wireless notification device 12, one example shown in Fig. 3, and a
27 base station 14, one example shown in Fig. 2. The wireless notification device
28 may be embodied as or integrated with a device or utensil which a user may use in
29 a work, office, or computing or telephonic environment or situation, such as a
30 pen, pencil, pointer, or other implement, device, or article. While a wireless
31 notification device is shown in the examples of Figs. 1, 2, 4, 6, and 7 as a writing
32 instrument such as a pen, it is understood that the wireless notification device
33 could be embodied as other devices, articles, or utensils.

1 In general, the notification device 12 of Fig. 1 is provided with information
2 from a base station 14 which provides the user with notifications of events that
3 have occurred at the user's desk, for instance, while the user was not at the user's
4 desk. For example, the wireless notification device 12 could inform the user of
5 the receipt of e-mails, the receipt of phone calls, the receipt of voice messages,
6 and meeting or calendar reminders, or any combination thereof. As used herein,
7 the term user's "desk" includes the locations where the user's computer and/or
8 telephone are located, such as a desk, computer area, workstation, work area, or
9 otherwise.

10 As shown in Fig. 1, the wireless notification device 12 may include a
11 display 16 for displaying notifications to the user. In one embodiment, the
12 display 16 is an LCD display positioned on the body 17 of the notification device
13 12 across a portion of the length of the notification device 12. In one
14 embodiment, the body 17 is generally elongated and cylindrically shaped having a
15 first end and a second end, although other body shapes may be used. Text or
16 other message information 18 is displayed on the display 16, and in one example
17 can scroll across or up or down on the display 16. If the user receives a phone
18 call, then a notification of the phone call can appear in the display 16 of the
19 notification device 12 with the details of the call. Upon receiving a new e-mail,
20 the user of the notification device 12 can receive a notification on the display 16
21 of the notification device 12. If a reminder for an appointment or meeting, for
22 example, pops up at the user's workstation, then the wireless notification device
23 12 can display such information for the user. In this manner, the notification
24 device 12 provides a discrete way of receiving information about what is going on
25 at the user's desk if the user is unable to be at the desk, in one example.

26 The notification device 12 may also be equipped with an audible or
27 vibratory indicator 20, in order to provide the user with an indication that new
28 information has been received by the wireless notification device 12, or that a
29 pending message or reminder needs attention.

30 The notification device 12 may also include a set of buttons or a keypad
31 22. In the example in Fig. 1, a scroll up and scroll down button 22a,b, as well as
32 a "clear" button 22c, are shown. The scroll up or down button(s) 22a,b provide(s)
33 the user with the ability to scroll through a queue of messages or notifications

1 that are maintained in a memory 23 (Fig. 3) of the notification device 12, while
2 the clear button provides a means for the user to delete a notification, or delete
3 the entire queue of notifications, as desired.

4 The clip 24 shown in the example of Fig. 1 can be a conventional pen clip,
5 or alternatively, as shown in Fig. 7, the clip 24 can activate a contact switch 26
6 positioned under the free end of the clip, wherein the contact switch 26 provides
7 the user control of the display contents. For example, in the embodiment shown
8 in Fig. 7, the clip 24 and contact switch 26 may provide the user with a means to
9 cycle through the notifications or messages in the queue. For instance, upon the
10 depression of the free end of the clip 24 onto the contact switch 26, the
11 information displayed in the display 16 of the notification device 12 could move
12 to the next item to be displayed. In another example, if the user presses down on
13 the free end of the clip 24 to activate the contact switch 26 for an extended period
14 of time (i.e., three seconds) then the queue of notifications in the notification
15 device 12 could be cleared, if desired.

16 Referring now to Fig. 2, one embodiment of a wireless notification system
17 is shown, including a notification device 12 having a wireless communication
18 link 30 with a base station 14. As shown in the embodiment of Fig. 2, the base
19 station 14 may include a cradle 38, a battery charger 40, and a wireless
20 transmitter 42 for transmitting the notifications over the wireless link 30 to the
21 notification device 12. The base station may be coupled with or integrated in a
22 computer 32 with a plurality of software modules 34a-e so that the base station
23 can receive data from the computer relating the events occurring in the computer.
24 The base station may also receive data from a phone 36.

25 The computer 32 of Fig. 2 may have various software modules 34a-e
26 therein, including a notification device interface software module 34e. The
27 notification device interface software module 34e is responsible for receiving a
28 signal from the cradle 38 indicating whether the notification device 12 is in or out
29 of the cradle 38. In one embodiment, if the notification device 12 is in the cradle
30 38, then the wireless notification system is placed in an idle mode, wherein
31 notifications of events that are occurring at the computer 32 and/or telephone 36
32 are not reported to the wireless notification device 12. In this manner, the queue
33 of notifications maintained by the wireless notification device 12 is not filled

1 with information that the user is already aware of, such as e-mails or telephone
2 calls which occur while the user is at his or her desk.

3 Further, the notification device interface software module 34e may receive
4 data from a plurality of other software modules in the computer 32, depending
5 upon the types of notifications which the user desires to receive. In one
6 embodiment, the notification device interface software module 34e receives or
7 monitors the e-mails which are received by the e-mail software 34a (such as
8 Microsoft's OUTLOOK (TM)) of the computer 32. In this manner, when an e-
9 mail is received by the computer, the notification device interface software
10 module 34e can generate a notification to the wireless notification device 12 of
11 information relating to the e-mail, such as the senders name, the time the e-mail
12 was sent, and the subject line of the e-mail, in one embodiment. Further, in
13 another embodiment, the notification device interface software module 34e
14 receives notifications which are generated by a meeting software module 34b
15 and/or a calendar software module 34c – such as Microsoft's OUTLOOK(TM). In
16 this manner, the notification device interface software module 34e can generate
17 reminder notifications to the wireless notification device 12 of meetings or other
18 calendar reminders that are generated by the meeting software module 34b or the
19 calendar software module 34c.

20 Further, the notification device interface software module 34e may be
21 adapted to receive data from a phone software module 34d, wherein the data may
22 include caller ID information such as the time a call was received, the phone
23 number of the caller, as well as the identification (i.e., name) of the caller.
24 Further, the notification device interface software module 34e may also receive
25 voicemail data from the phone software 34d, including the time and date of a
26 voicemail message, as well as the caller's identification. This information can be
27 used by the notification device interface software module 34e to generate a
28 notification to the notification device 12.

29 The notification device interface software module 34e may also be in
30 communications with a wireless transmitter 42, so that when the notification
31 device interface software module 34e has received data relating to an event of
32 which the wireless notification device 12 is to be notified of, the notification

1 device interface software module 34e formulates a message to be sent via the
2 wireless transmitter 42 to the wireless notification device 12.

3 Fig. 3 illustrates a block diagram of a wireless notification device 12, in
4 accordance with one embodiment of the present invention. As shown in Fig. 3,
5 the wireless notification device 12 may include a microprocessor or other
6 programmable logic device 50 coupled with a display 16 and other user indicators
7 20. The display 16 can be an LCD display capable of displaying alphanumeric
8 text or other indicators, and the user indicators 20 may include lights, vibrational
9 indicators, audible indicators, or any other form of indicators which a user of the
10 wireless notification device 12 can perceive. The buttons and/or keypad 22 are
11 inputs to the microprocessor 50, and the microprocessor 50 receives and detects
12 keypad or button 22 depressions by the user and takes appropriate action upon
13 such depressions. The wireless notification device 12 is further provided with a
14 memory 23, which may be persistent, in which to maintain a queue of
15 notifications received. In one example, the memory 23 of the wireless
16 notification device 12 is of sufficient size to provide the wireless notification
17 device 12 with a buffer of 256 notifications, and further, the queue or buffer of
18 notifications may be a "first in, first out" buffer which the user can cycle through
19 using the buttons or keypad 22, in one embodiment. Other buffer sizes and
20 management techniques may be utilized as needed for particular applications.

21 A wireless receiver 52 is provided in the wireless notification device 12 so
22 that the wireless notification device 12 can receive the data transmitted by the
23 base station 14. The receiver 52 provides this received data to the microprocessor
24 50 for processing therein. A battery 54, rechargeable in one example, is also
25 provided on the wireless notification device 12, and the battery 54, in one
26 embodiment, provides power to the wireless notification device 12, including to
27 the receiver 52, microprocessor 50, memory 23, display 16, and any other
28 circuitry which requires power. In one embodiment, the microprocessor 50,
29 battery 54, receiver 52, and memory 23 are located within the body 17 of the
30 notification device 12.

31 As shown in Fig. 3, the wireless notification device 12 may be provided
32 with a unique code 56 which uniquely identifies the wireless notification device
33 12. In one embodiment, the unique code 56 may be a serial number embedded in

1 the software of the microprocessor 50, or a unique code stored in a non-volatile
2 memory in the wireless notification device 12. Or the unique code 56 may be
3 passed from the base station 14 to the wireless notification device 12.

4 The unique code 56 is used such that upon insertion of the wireless
5 notification device 12 into the cradle 38 of the base station 14, the base station 14
6 reads the unique code 56 from the wireless notification device 12 and then
7 transmits this unique code as a header of wireless messages transmitted to the
8 wireless notification device 12. In this manner, multiple wireless notification
9 devices and systems can be used in an office space and each wireless notification
10 device will receive and decode only messages which are intended for that
11 particular notification device.

12 Now referring to Fig. 4, a state diagram is shown with various states of one
13 example of a wireless notification device 12 and how these states or modes are
14 cycled through depending upon various events occurring. In one embodiment,
15 initially at startup, the wireless notification device 12 is in an "idle or recharge"
16 state 60 when the notification device 12 is in the cradle 38. In this state 60, the
17 base station 14 may read the unique code 56 of the wireless notification device 12
18 and use this unique code as a header to transmit subsequent notifications to the
19 wireless notification device 12.

20 When the notification device 12 is removed from the cradle 38, then the
21 notification device enters a "receive" mode or state 62 in one example wherein
22 the notification device 12 waits for data to be transmitted by the base station 14
23 to the wireless notification device 12. When a message is received from the base
24 unit 14, the notification device 12 in one example enters a "queuing" mode 64
25 wherein the notification device 12 receives and stores the message or messages
26 received from the base unit 14. In this state 64, the wireless notification device
27 12 can activate an indicator 20 or display some data on the display 16 indicating
28 to the user that one or more messages or notifications have been received from
29 the base unit 14. Furthermore, in one embodiment, as additional messages are
30 received, they are queued by the wireless notification device 12 and stored in
31 memory 23. Further, as indicated above, the indicator 20 to the user which
32 indicates that a message or messages are present can take the form of a graphical

1 display 16, the illumination of a light or LED, an audible signal, a vibration, or
2 any other indication which can be perceived by the user.

3 If messages have been received and queued by the wireless notification
4 device 12, then when the user presses a key 22 on the notification device 12, such
5 as the scroll up key 22a or scroll down key 22b, then the “display message detail”
6 state 66 of Fig. 4 is entered, in one embodiment. In this state 66, the details of a
7 message can be displayed to the user if desired. For instance, as the user scrolls
8 up or down through the messages in the queue, if the user then presses the “more”
9 button 22c, then more details about the particular message can be displayed on
10 the display screen 16 of the wireless notification device 12. In one embodiment,
11 each notification message provided to the user has multiple screens of data (i.e.,
12 see Fig. 5A; for instance, a call notification can include a screen to show the
13 telephone number, a screen to show the caller’s name, and a screen to show the
14 time and date of the call). In one embodiment, the messages in the queue are
15 displayed hierarchically such that a user can delineate whether the notification is
16 a notification of a telephone call, a voice message, a calendar reminder, a meeting
17 reminder, or a receipt of an e-mail, or any combination thereof. If more messages
18 are received by the notification device 12, then the messages are queued.

19 If the user places the notification device 12 in the cradle 38 (or, in one
20 example, the user presses the clear button 22c to clear all the messages in the
21 message queue), the “clear/reset” state 68 is entered wherein the queue is cleared
22 and the display 16 is also cleared, in one embodiment. The wireless notification
23 device 12 can then enter the idle/recharge state 60 shown in Fig. 4. In this
24 manner, the wireless notification device 12 is in an active mode of receiving and
25 storing/queuing messages when the notification device 12 has been removed from
26 the cradle 38 by the user, and once the notification device 12 is placed in the
27 cradle 38, the wireless notification device 12 enters the idle/recharge state 60.

28 Figs. 5A-5E illustrate various examples of display screens for a wireless
29 notification device 12. It is understood that the display screens shown in Figs.
30 5A-5E are by way of example only, and the content of any particular display is a
31 matter of choice depending upon the particular implementation. Referring to Fig.
32 5A, various data elements of a telephone call notification are illustrated,
33 including the telephone number of the caller, the name of the caller, and the time

1 and date of the call, in one embodiment. In Fig. 5B, various data elements of a
2 voice message notification are illustrated, and include in one embodiment the
3 telephone number of the caller, the name of the caller, and the time and date of
4 the voice message. In Fig. 5C, various data elements of a reminder notification
5 are illustrated, and in one embodiment include the title of the reminder, as well as
6 the due dates and time of the reminder.

7 In Fig. 5D, various data elements of a meeting reminder notification are
8 illustrated, and in one embodiment, include the time and date of the meeting, the
9 topic of the meeting, and the location of the meeting. In Fig. 5E, various data
10 elements of an e-mail notification are illustrated, and in one embodiment include
11 the name of the sender, the subject line, and the date and time the e-mail was
12 sent.

13 It can be seen that the various displays of Figs. 5A-5E can provide the user
14 of the wireless notification device 12 with useful information relating to various
15 events which have occurred at the user's desk or computing station while the user
16 was away.

17 Fig. 6 illustrates one example of a notification device cradle 38, in
18 accordance with one embodiment of the present invention. As shown in Fig. 6,
19 the cradle 38 may include a base portion 70, and an enclosure portion 72 adapted
20 to removably receive the wireless notification device 12 therein. The cradle 38
21 includes, in one embodiment, a battery charger 40 for charging the battery 54 of
22 the wireless notification device 12 when the wireless notification device 12 is
23 positioned in the cradle 38. The cradle 38 may also include, in one embodiment,
24 the transmitter 42 which may be positioned in, on, or about the base portion 70 or
25 the enclosure 72, or integrated therewith.

26 The cradle 38 may further include a cable 74 for providing the cradle 38
27 with power to recharge the rechargeable battery 54 of the wireless notification
28 device 12, as well as to provide a signal line from the cradle 38 to the notification
29 device interface software module 34e (Fig. 2) indicating whether the notification
30 device 12 is in or out of the cradle 38. While Fig. 6 shows a cradle 38 which is a
31 adapted to receive a wireless notification device 12 embodied as a writing device,
32 it is understood that other cradle shapes could be used to receive wireless
33 notification devices, or portions thereof, having different shapes or embodiments.

1 While the methods disclosed herein have been described and shown with
2 reference to particular operations performed in a particular order, it will be
3 understood that these operations may be combined, sub-divided, or re-ordered to
4 form equivalent methods without departing from the teachings of the present
5 invention. Accordingly, unless specifically indicated herein, the order and
6 grouping of the operations is not a limitation of the present invention.

7 The foregoing embodiments and examples are to be considered illustrative,
8 rather than restrictive of the invention, and those modifications, which come
9 within the meaning and range of equivalence of the claims, are to be included
10 therein. While embodiments of the invention have been particularly shown and
11 described, it will be understood by those skilled in the art that various other
12 changes in the form and details may be made without departing from the spirit
13 and scope of the invention.

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